

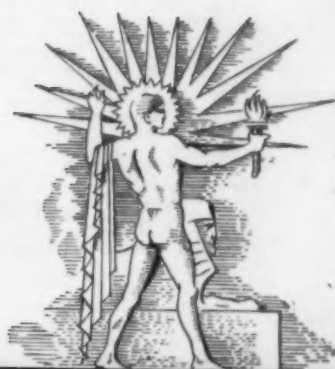
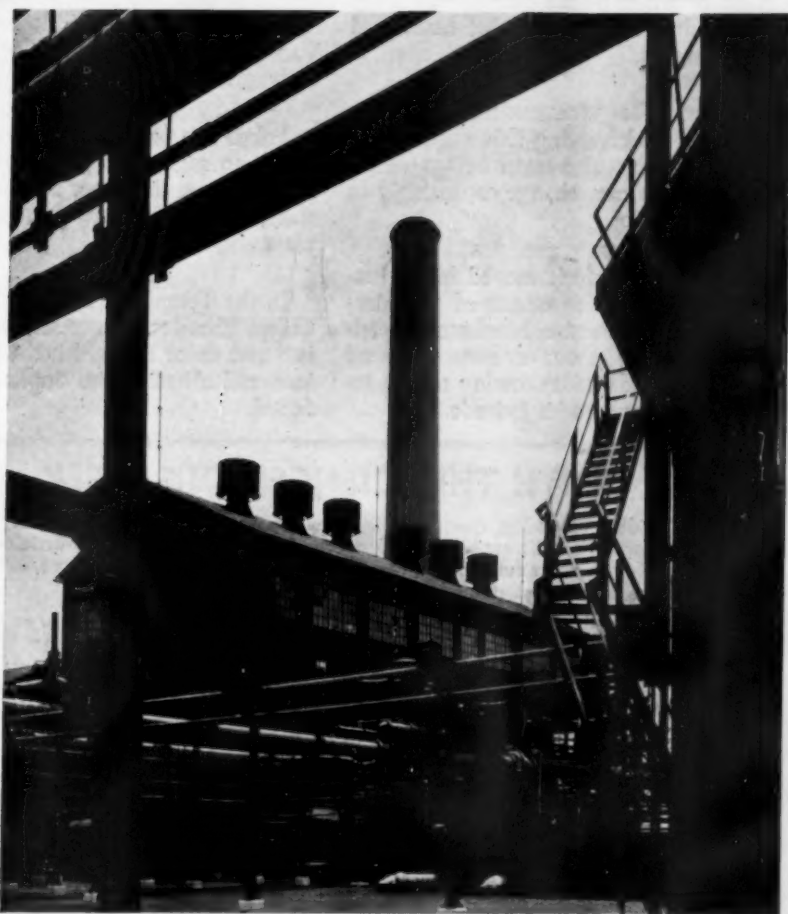
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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



AUGUST 20, 1932

Cradle of Hydrogen, Wonder-Worker

See Page 111

SCIENCE SERVICE PUBLICATION

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Summary ofCurrent  
Science

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## DO YOU KNOW THAT

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Most of the vegetables grown in the United States can be grown in Alaska.

Wood impregnated with rubber is being used for some parts of violins.

About one-half the world's lepers are in China.

A man standing at the North Pole is about thirteen miles closer to the center of the earth than a man standing at the Equator.

A physicist at the University of Cincinnati has devised a wave-motion machine by which he can demonstrate more than thirty forms of light, heat, and sound waves.

A naturalist points out the need for a method of identifying fish, such as the finger-printing of human beings; since growing fish may change confusingly in shape and color.

A pendulum clock, moved from Ottawa, Canada, to the mouth of the Mackenzie River in the Northwest Territories, gained about one minute and twenty seconds a day, owing to the increase of gravity with latitude.

All fishes apparently contain iodine, usually in minute quantity.

Butter is the one food which may be artificially colored without being so labeled.

The Nisqually Glacier in Mount Rainier National Park is receding approximately seventy feet each year.

A new law in Costa Rica requires that bakeries mix ten per cent. of the native yucca flour with wheat flour used in bread making.

The largest single spring in America, called the Big Spring and situated near Van Buren, Missouri, has a maximum daily yield of 711,000,000 gallons.

Tokyo is a youngster among Japanese cities, no more than 350 years old; in contrast to such places as Kyoto where structures have been preserved 1,300 years.

In the Temple of Heaven, in Peking, China, the dome representing the sky is a rare color for which the formula is lost, and all efforts to duplicate it have failed.

## WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the articles, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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*ings Third International Congress on Bituminous Coal*—Carnegie Institute of Technology, 1932, 2 vol., \$15.

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What did forty-seven little goldfish do at Yale University? p. 113

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Are girls more devoted to their fathers than to their mothers? p. 111

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For what disease has the death rate spurted upward alarmingly? p. 121

## RADIO-ASTRONOMY

How will sunspots affect radio observations of the eclipse? p. 117

Where will neutral corpuscles be tested? p. 117

CHEMISTRY

# Hydrogen Remakes Petroleum Into More Useful Products

Wonder-Working Hydrogenation Process Produces Ideal Oil At 3,600 Pounds Pressure and 1000 Degrees

**H**YDROGEN, lightest of the elements, is a wonder-worker in industrial chemistry. The pushing of more hydrogen into substances, called hydrogenation, makes fluid vegetable oils into synthetic hard fats, carbon monoxide into useful methanol or "wood alcohol," coal into lubricating oil and gasoline, and poor lubricating oil into superior lubricant.

The marketing of a synthetic lubricating oil, remade from indifferent crude oil by a process of hydrogenation, by the Standard Oil Company of New Jersey, signals the successful application of hydrogenation to the oil industry in America.

In Germany, the native home of hydrogenation applied to fuels, Leuna synthetic gasoline, made from lignite, has been on the market since 1927. Germany, without oil fields, had the problem of making solid fuel into liquids that could be used in its automobiles. America, flooded with petroleum from too numerous wells, had no such problem, but the Standard Oil Company chemical engineers have put the German tricks of hydrogenation to new uses and added some of their own.

On the Jersey flats at Bayway stands the oil hydrogenation plant, an intricate maze of pipes and towers, capable of changing for the better the characteristics of 3,500 to 5,000 barrels of oil a day. Hydrogen at the rate of two or more million cubic feet a day is made from gaseous by-products of gasoline refineries nearby. This is a new, inexpensive and American way of making hydrogen. The petroleum gas is mixed with steam and passed through tubes filled with a catalyst and heated to 1800 degrees Fahrenheit, producing hydrogen mixed with carbon monoxide. Other steps in the process turn the carbon monoxide plus more steam into more hydrogen and soda-water gas, chemically known as carbon dioxide, which is scrubbed out by a seawater bath.

## FRONT COVER ILLUSTRATION

A striking view of the hydrogen plant framed in a maze of overhead piping. Refinery cracking coil gas is treated to obtain the pure hydrogen with which to build up the molecules of heavy oil.

See Front Cover

"Chemical parsons" or catalysts, substances that themselves do not enter into the reaction, boss the chemical changes in the hydrogenation plant. These catalysts are like mysterious minds that direct the chemical changes. How they do it is nearly as unknown as are the workings of the human mind.

## "Chemical Parsons" At Work

The catalyst that puts the hydrogen into the oil is a white mixture of chromic and other oxides, looking like unmarked dice and drugstore pills. It does its work in immense reaction chambers, forty-foot alloy steel towers, with seven-inch walls, the world's largest alloy steel forgings. Through them are forced the hydrogen and oil at 3,600 pound pressure and 750 to 1000 degree temperature. The oil molecules have a rebirth under these terrific conditions.

So quiet and automatic is the process that an uninformed visitor standing a few feet from the concrete structure housing hydrogenation units working full tilt might think that the plant was idle.

Hydrogen is highly explosive and

dangerous if mixed with only a little air. The extreme temperatures and pressures to which it is subjected increase the hazard, yet so many safeguards are introduced into the process that there has never been an accident in the two years of plant operation.

While lubricating oil is its principal product, the hydrogenation plant at Bayway and its duplicate at Baton Rouge, La., can make solvents for paint, varnish, lacquer, soap and textile industries, safety gasoline for use in aircraft and motorboats, benzol substitute, kerosene and other products.

The conversion of liquid vegetable fats that do not have all the hydrogen they can carry into solid saturated ones is an industry of great importance. The semi-solid vegetable shortenings that substitute for lard so extensively today are made by partially hydrogenating such liquid fats as cottonseed oil. Hydrogenated fats are also extensively used in the manufacture of soap. Dr. Paul Sabatier, French chemist, developed this process of hydrogenation using nickel as a catalyst, and he won the Nobel prize for chemistry in 1912.

Dr. Friedrich Bergius was the pioneer in hydrogenation of coal and petroleum, and the award of the Nobel prize for chemistry in 1931 acknowledged his achievement. The Bergius process was developed by the extensive research organization of the I. G. Farbenindustrie, the German chemical trust, and to Dr. Mathias Pier of that organization is credited the development of the important catalysts that boss the injection of hydrogen into the molecules.

When Dr. Fritz Haber and Dr. Carl Bosch combined hydrogen with nitrogen

PSYCHOLOGY

# Finds Children Do Not Prefer Parent of the Opposite Sex

**T**HE FREUDIAN theory that all children tend to prefer the parent of the opposite sex failed of confirmation in a study conducted by Dr. John E. Anderson, of the University of Minnesota, he announced in a report to the Southern Society for Philosophy and Psychology published in the *Psychological Bulletin*.

Dr. Anderson sent questionnaires to the parents of 3,178 children, of whom 1,626 were boys. They revealed that there are no outstanding sex differences

at any age level in attachment for parents. About half of both girls and boys have no favorites in the household. Of the others, there is a slight tendency for both boys and girls to prefer the mother; this tendency decreases with age. Jealousy is displayed more often when the mother shows affection to another child than under any other circumstances. Jealousy decreases with age and is somewhat more likely to be present in girls than in boys.

Science News Letter, August 20, 1932



from the air to make the necessary nitrates for fertilizers and explosives needed by warring Germany, which was cut off from natural nitrates of Chile, they contributed largely to the later development of hydrogenation of fuels. In 1927 the Standard Oil Company of New Jersey began cooperation with the German I. G. in the world use of hydrogenation, and American chemists, among them F. A. Howard, Dr. R. T. Haslam, R. P. Russell, Dr. C. E. Lanning and Dr. G. M. Maverick, revised the process to meet new conditions and brought the process to larger scale operation.

*Science News Letter, August 20, 1932*

#### ENTOMOLOGY-PUBLIC HEALTH

### Airplanes Spray Oil On Mosquito Marshes

**A**IRPLANES, already extensively used in man's war against insect pests, have added a new role to their usefulness. They carry oil to spray on mosquito-breeding swamps. The new use is described by Dr. Joseph M. Ginsburg of the New Jersey agricultural experiment station, New Brunswick, N. J., in a report to *Science*.

Airplanes had already been used against mosquitoes, carrying arsenic dust. This is effective against the species whose larvae, or "wigglers," feed at the surface. But some of the Jersey "skeeters" feed at the bottom, where enough arsenic to kill them could be sunk only at the expense of making the pools dangerously poisonous to cattle. Hence the necessity for coating such waters with oil, to smother the larvae instead of poisoning them.

In the plane used at the New Jersey station, two fifty-gallon tanks were installed in the forward cockpit. From them a long pipe ran backwards under the fuselage, terminating in a cross pipe just below the rudder. The cross pipe was perforated with numerous small holes to serve as a nozzle.

The oiling plane can be used only in still weather, for wind would blow the oil spray away from its intended target. But under proper conditions the method is very rapid: an eight-acre tract of wet meadow was covered with an oil spray in forty minutes.

The method is recommended only for mosquito breeding areas where the entire terrain has to be oiled. Where the breeding places are scattered and accessible for hand oiling, the older method is believed to be more economical.

*Science News Letter, August 20, 1932*

#### ARCHAEOLOGY



A GREAT MAN OF CALAKMUL

A fine sculptured portrait of some unknown ruler or priest, set up by the Mayan Indians in Calakmul, in the year 472 A.D., or 731 A.D.—according to different readings of the date. The important Mayan was portrayed wearing a tall headdress and carrying a spear in his right hand. Carnegie Institution explorers found the large sculptured monument lying flat on its face. In this position, the delicate carving had been protected from the erosive action of the elements through more than a thousand years.

## ARCHAEOLOGY

# Only One Building Standing In American Pompeii

**Dr. Morley Makes First Detailed Report of Newly-Found Calakmul, Estimated to Be Fifteen Centuries Old**

**A** VOLCANO wrecked Pompeii; tropical plants and trees with incredibly strong fingers pulled down the ancient American city of Calakmul.

In the first detailed report on the exploration of Calakmul, new Mayan city discovered in southern Yucatan, Dr. Sylvanus Morley of the Carnegie Institution of Washington tells of the complete ruin of a once mighty Indian metropolis.

In the entire city, the expedition found just one building standing, though on every side were great piles of fallen stone, bearing testimony to the former size and importance of Calakmul.

The architect and surveyor of the expedition John S. Bolles, made a surveyed map of the center of the city, where civic and religious buildings were clustered. This area is found to be one and one quarter miles long and half a mile wide. Beyond it, smaller mounds and pyramids extended into suburbs of unknown dimensions.

The expedition counted 103 stone monuments, the greatest number ever found in any Mayan city. Deciphering dates on forty-five of the stones, Dr. Morley established the period of Calakmul's grandeur. It was, he reports, a city of latter years of the Old Mayan Empire. According to one school of archaeologists the dates are translated into our calendar as the years 364 to 551 A.D. Another method of reading the dates gives a correlation more than two centuries later.

The explorers found an ancient quarry where the city builders went for stone. Two large blocks of stone, partially quarried out by long-forgotten workmen, may still be seen there.

In one court, the explorers came upon a flat outcrop of limestone, twenty-one feet by fifteen feet, on which Mayan sculptors had carved a scene of six prisoners, bound with ropes. To photograph this rock, the expedition staff erected a platform seventeen feet above the ground.

From the well-known Mayan city of

Chichen Itza in northern Yucatan, it is only about 125 miles to Calakmul by straight air-line. But the Carnegie expedition reached the site from Chichen Itza by a route three times that distance, traveling by train, sail boat, motor boat, platform cars drawn by mules, truck and finally journeying the last seven miles with a mule-train into the depths of the forest. The trip took nearly a week.

The Carnegie Institution believes that the most important result of the expedition may be the opening up of this no-man's-land between the Old and New Empires of the Mayan Indians. The reason for the downfall of the Old Mayan Empire is still one of the mysteries of ancient America.

*Science News Letter, August 20, 1932*

## PHYSIOLOGY

## Goldfish X-Rayed to Show Development of Pigment

**F**ORTY-SEVEN little goldfish have been given X-ray tests to shed light on the little-understood subject of the cause of the formation of pigment-car-

rying cells in man and lower animals. In man, these pigment-carrying cells erupt in the skin, forming unsightly dark blue patches. Sometimes these patches are birth marks, sometimes they are acquired later, as the result of injuries or irritations.

Results of the goldfish experiments are reported to the *American Journal of Cancer* by Dr. George Milton Smith of the Yale University School of Medicine.

In order to X-ray only one side of the forty-seven lively fish, Dr. Smith anesthetized his small subjects. After five or six days of carefully regulated X-ray treatment, the exposed side of each fish began to erupt tiny cells carrying dark coloring matter. These made splotches of black under the transparent outer skin of the fish, and formed interlacing patches against the dark red bodies of the fish.

After the treatments, the dark patches remained for almost two weeks and then took from eleven days to about a month to disappear, leaving the fish in the same state as before the experiment—except for four subjects that were so acutely affected that they died, apparently from a secondary infection.

Why X-ray exposure causes goldfish to respond by mobilizing these dark, color-carrying cells in the skin, is not yet clear, Dr. Smith reports. There is, he suggests, some connection with repair and defense processes. The whole matter is important to physicians because of the possible connection of the formation of these pigment cells or melanophores with the development of pigmented tumors.

*Science News Letter, August 20, 1932*

## ENTOMOLOGY

## New Gypsy Moth Infestation Area Found in Pennsylvania

**E**NTOMOLOGISTS of the U. S. Department of Agriculture are preparing to cooperate with the Pennsylvania Department of Agriculture and the State Department of Forests and Waters in a campaign to wipe out a newly-discovered infestation of gypsy moth in the mountains near Pittston.

This insect, introduced originally from Europe, has for years been a pest in New England, and at one time threatened to wipe out some of the finest forest and park trees in that region. The present outbreak in Pennsylvania is

well outside its former known range, but is causing no alarm, for there are no tree nurseries in the area affected, so that there is no danger of its being unwittingly shipped out. The infested area so far surveyed is about four by eight miles in extent, and consists principally of cutover land. It is considered probable that further surveys will find the insect in an even larger area.

Although it will require great effort to exterminate the pest, economic entomologists know from past successes in similar campaigns that it can be done.

*Science News Letter, August 20, 1932*

ANATOMY

# New Palm Study Is Real Science

Scientists Don't Tell Fortunes, But Palm Prints May Indicate Your Race and Show Whether You're Left-Handed

By JANE STAFFORD

**C**ONSERVATIVE scientists have now taken up the study of palms. They do not attempt to see your future in your hand, like the gypsy fortune teller, and they will not predict how many marriages you will make or that you are going on a journey across water. But from the ridges and surface markings on your palms they can tell you many interesting facts about yourself.

Scientific palmistry, for instance, distinguishes differences between naturally right- or lefthanded persons. It finds differences among races, and it furnishes another means of identifying you, for your palm is different from every other one in the world.

Most important from the scientific standpoint is the fact that the markings on your palm may reveal your race. That these patterned markings are different in different races was first discovered by the late Dr. Harris H. Wilder, professor of zoology at Smith College. A number of scientists have made such studies subsequently and chief of the group now is Dr. Harold Cummins, professor of anatomy at Tulane University.

"The skin of the fingers, palms and soles of the foot is delicately ridged, like corduroy on a reduced scale," Dr. Cummins explained, "and the ridges in certain localities are fashioned in patterns of arched, looped and concentric forms. These markings are known as dermatoglyphics, which means literally skin carvings."

The question of whether you are naturally right- or lefthanded was settled before you were born, Miss Stella M. Leche of the anatomy department of Tulane recently reported. Miss Leche spent two years studying the ridges and surface markings of the palms of 244 lefthanded persons and comparing them with those of 300 persons chosen at random. The markings on the skin of the palms are known to be different for the right and left hands. Likewise they show which is the dominant hand, that is, the hand which you tend to use naturally for writing, cutting and other similar tasks.

Since the nature of the markings on the palms is determined long before birth, Miss Leche concluded that the matter of which hand will be dominant is also decided at this early period. This has a decided practical bearing, because psychiatrists have recently come to the conclusion that stuttering and many other behavior disorders are the result of forcing a naturally lefthanded child to use his right hand, or the reverse.

The transformation of lefthanded persons into righthanded ones produces an internal strain or mental limp, according to the explanation of one psychiatrist. This psychic limp shows itself in behavior disorders of varying degrees, such as illegible writing, mirror writing, difficulty in reading, stuttering, school failure, truancy, lying and stealing.

The left hand and side are dependent on the activity of the right half of the brain, while the left half of the brain governs the right hand and side. When the left hand is called upon to move in accordance with directions and controls from its own left brain lobe, nervous tension results. There is a rerouting of impulses which involves a slowing-up process and likewise affects the normal channels for coordination.

## Detecting Dominant Hand

Up to now, however, there has been no very sure way of telling whether a small child was naturally right- or lefthanded. Sometimes the child showed a tendency to use his left hand for throwing a ball or holding a spoon or crayon. But parents were apt to think that this was merely childishness, something he would outgrow or should be taught to overcome.

Each person has a dominant eye as well as hand, but this is difficult to determine in a preschool child. Usually a righthanded person will be right-eyed. You can test yourself to see which eye you depend on most by closing one eye and keeping the other open. The one you keep open is probably the one you depend on most for seeing. A small child, however, might not cooperate in even such a simple test, much less in the more complicated ones devised by



MAKING HIS MARK

*It may show that he was born lefthanded; hence being forced to use his right hand might have caused nervous disorders.*

scientists. Furthermore, in older children and grown-ups some defect of vision might have occurred in the naturally dominant eye so that the other one became dominant, in which case the eye test to determine handedness would not give the correct result.

Some scientists hold the opinion that the dominant arm is longer than the other and that this might be a test for handedness.

The palm prints offer an additional test, which with the others affords a basis for predicting quite early in a child's life which hand he should be encouraged to use.

So the modern babe may soon be having his palm prints taken not only to serve as means of identification, but to show whether the child is going to be a "southpaw" or whether he will wield pen, knife or other implements in his right hand.

No two palms or soles are alike, any more than any two fingers are alike. This is why palm prints offer another means of identification, like fingerprints.

There are, however, certain racial trends in the patterns marked on the palms and soles. Scientists skilled in



dermatoglyphics can now tell, for instance, the difference between the hand or foot prints of the Japanese race, the white, the Negro, the Eskimo or the Indian.

Certain criteria for distinguishing races already exist, among them finger prints. Other physical traits used in the comparative study of human groups are stature, facial features, and most important of all, measurements and proportions of the skull. Now, in scientific palmistry, anthropologists hope to gain a new criterion for comparing the races of man.

### Palm Prints Show Race

Men all over the world are helping Dr. Cummins to collect palm and sole prints, so that he can extend his studies to include various races. Thus far besides the white race, both European-Americans and Jews, he has studied Negroes, Mayas, Eskimos, North American Indians, Jews, Siamese and Syrians. Archaeologists and other explorers, and former medical students send him the prints which form the material for his study in his New Orleans laboratory.

When Henry B. Collins of the Smithsonian Institution was at St. Lawrence Island, Alaska, on an archaeological expedition one summer, he lined up a number of Eskimos, children, adolescents and some adults, too, to be "printed." With much giggling and amusement the Eskimos submitted to having an inked roller run over the sole of the foot, a tickling process, as well as a novel one, and to having an inked glass pressed against the hand. The impression was stamped on paper. The Eskimo prints were then studied by Dr. Cummins and his associate at Tulane University, Dr. Charles Midlo. They found a distinct racial trend in the combinations of patterns and configurations of the Eskimo palm and sole prints.

Another archaeologist took prints of Maya palms and soles when on an expedition into the Maya country of Yucatan, and sent them back to Dr. Cummins. A medical man now in Bangkok has taken prints of the Siamese and another is doing the same thing in Syria. Frederick Starr took them of Negroes in Liberia, which Dr. Cummins was then able to compare with those of Negroes in New Orleans.

One important advantage of dermatoglyphics over other bodily features which may be compared in various races is that these patterns and markings are established in their final form long before birth and never change during an individual's lifetime.

The measurements and shape of the skull have been considered the best method scientists had for distinguishing racial differences. However Dr. Franz Boas of Columbia University has found from a study of the descendants of immigrants in America that after several generations of life in this country the characteristic head forms of different races began to change. Whether these changes are due to changes in diet or environment is not known, but apparently it is not possible to tell so infallibly to what race a person belongs by measuring his skull. But there is no question of environment or experience altering the palm markings.

Dr. Cummins recently reported the first scientific study of the palm and sole patterns of North American Indians. The first tribe to have palm and sole prints taken for scientific purposes is the Shoshoni-Arapaho of the Shoshoni Indian agency in Wyoming. Studying the finely sculptured patterns, Dr. Cummins found a "definite racial trend." And when he compared the Indian tribe's prints with those of white subjects, he found the distinctiveness of the Indian prints emphasized by the contrast.

"For example, in the European-Americans a true patterned arrangement, usually a looped figure, is found frequently on the muscular eminence of the little-finger side of the palm," he explained; "in the Indians its occurrence is very rare. In European-Americans there is a far more pronounced tendency of the skin ridges to run transversely across the palm, contrasting with the Indian character of more nearly longitudinal course. Such contrasts might be multiplied."

### Eskimo Palms Like Chinese

When the Indian prints were compared with prints of Eskimos and Chinese, the three groups showed many points of similarity. This is another point suggesting the Asiatic origin of the old native inhabitants of America.

From Dr. Cummins' explanation of the differences in prints of Indian and white palms, you can see that the markings which he and his associates study are quite different from the ones the gypsy fortune teller traces on your palm. No "marriage lines" or "life lines" appear in the language of scientific palmistry.

"Main lines," however, are traced on the palm print with the aid of a hand magnifying glass. On a typical hand there are four "main lines," also four "digital triradii." The latter are triangu-

lar spots, one at the base of each finger, marking the common meeting point of tiny ridges which run in three chief directions. "Main lines" are traced from their start at these "digital triradii."

If you look at your palm through a hand lens, you will see how difficult it is to find either the triangular spots at the base of the fingers or the main lines, and these two features are merely the starting points for determining individual palm patterns. After the patterns have been formulated for a number of individuals belonging to a racial group, the same general trend will be noticed in them. When a number of palms are found with different general trend in their configurations, the owners of these palms may be identified as belonging to another racial group.

That, roughly, is the way in which Dr. Cummins and his associates go about distinguishing races and individuals by means of palm prints. And it explains why only those skilled in dermatoglyphics can make such identification, and why Dr. Cummins said that it is impossible to determine the race of a single individual by dermatoglyphics.

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Science News Letter, August 20, 1932

### CHEMISTRY

### Iodine Test May Show Vitamin C in Orange Juice

A SIMPLE test with iodine may some day be used to determine the amount of vitamin C in preserved orange juice, its appears from experiments by M. A. Joslyn and G. L. Marsh of the Fruit Products Laboratory of the University of California.

These investigators found that titrating orange juice against a standard iodine solution gave a good indication of the degree of deterioration.

In reporting their experiments in the scientific journal, *Science*, they point out that work of other investigators, Szent-Gyorgi, G. C. King, and W. A. Waugh, has shown that vitamin C is the same as hexuronic acid, chief constituent of the reducing substance in orange juice which reacts with the iodine in their test for deterioration.

Science News Letter, August 20, 1932

So little was known of deafness in the Golden Age of Greece, that Aristotle taught that "the deaf have no souls and are little better than animals."

# ● Points of View

## AUTOGYRO

**W**ITH radio-equipped autogyro, special cameras for photographing the infrared and ultraviolet light of the eclipsed sun, and camera for natural color photographs of the corona, a group of Springfield, Mass., and Hartford, Conn., scientists and engineers plan an eclipse expedition on August 31 to the White Mountain region of the path of totality.

The autogyro with special radio license call letters WIOXN, owned by John Wells of Southbridge, Mass., will conduct five-meter wavelength tests co-operating with radio ground parties in charge of Ross Hull of the American Radio Relay League of Hartford, Conn.

The program of ultraviolet and infrared photography will be carried out by B. V. K. French of the United American Bosch Corporation, Springfield, Mass., and Kenneth L. Henderson and Charles Guerton of the same organization will operate a ten-inch photographic reflector of 8-foot focal length exposing one color plate for the whole period of totality. Dr. E. D. Tillyer of the American Optical Works will co-operate in observations and equipment construction.

Motion pictures of the shadow bands and other eclipse phenomena will be taken by F. C. Beekley of the American Radio Relay League and Arthur H. Lince of the Bell Telephone Laboratories, New York City. C. John Franks of Boonton, N. J. and Dr. Lloyd A. Jones of the Eastman Kodak Research Laboratories are expected to participate in the program while William Butcher, time study expert of the United American Bosch Corporation will schedule the operations.

The party will have the cooperation of Joseph Dodge, manager of the Appalachian Mountain club and will base at the Pinkham Notch huts of the club.

## AIRPLANE OBSERVATIONS

**D**R. IRVING LANGMUIR, General Electric Co. chemist, will observe the solar eclipse of Aug. 31 from an airplane starting from Concord, N. H. in time to reach the center of the band of totality at the time the moon hides the sun.

As Dr. Langmuir's airplane will be equipped with instruments for fog fly-

ing, he will be able to rise above any clouds that may obscure the spectacle from the ground.

Two motion picture cameras, one with telephoto lens, will be carried and Dr. Langmuir will photograph the advance of the moon's shadow and take photographs of the corona.

**D**R. CLYDE FISHER, curator of astronomy of the American Museum of Natural History, will photograph the sun's eclipse from an airplane flying in the path of totality in Maine.

## MONTREAL

**C**HOOSING to observe the eclipse of Wednesday, Aug. 31, from near the edge of the path of totality, Prof. Herbert Dingle of the Imperial College of Science and Technology, London, assisted by members of McGill University at Montreal, will make photographs of the sun's spectrum that are expected to be superior to previous efforts.

On the roof of a McGill University building, a large spectroscope with lens of 16-foot focus will be mounted. The bright line spectrum at the cusp of the partially eclipsed sun during the half hour before and after totality will be photographed with large dispersion. Prof. A. Fowler, a colleague of Prof. Dingle, made visual observations at a partial eclipse in London twenty years ago which cause Prof. Dingle to hope that the coming observations will yield more accurate values of the wavelengths of the bright line spectrum than those now available.

A photograph of the Fraunhofer spectrum of the sun's limb just before and after totality is expected to give a photograph free from the diffused atmospheric light from the center of the sun's disc.

## BIDDEFORD

**C**ANISIUS College will send an expedition to observe from near Biddeford, Me., within the path of totality. It will be headed by Rev. John P. Delaney, S. J., professor of physics, and Dr. James H. Crowdle, professor of chemistry, will be a member of the party. Photometric studies of prominences and corona radiation and spec-

troscopic photographs will be the principal observations of the party.

## TIME SIGNALS

**S**PECIAL radio signals will be transmitted by CNRO, the Canadian National Railways station at Ottawa, to aid in the research upon the radio effect of the eclipse, Dr. A. S. Eve, director of the McGill University department of physics, has announced.

The transmissions will be on 600 kilocycles (500 meters) from 2 to 7 P. M., Eastern Daylight Saving Time, on Aug. 31, and for four days before and two days after the eclipse, the signals will be transmitted from 3 to 6 P. M. EDST.

Dr. Eve suggests that radio observers in eastern United States might measure the strength of the radio signals with a suitable galvanometer attached to their receiving sets.

The tests are expected to aid in understanding the way the sun affects the ionized layers of the earth's atmosphere that act as reflectors for radio waves.

**T**O GIVE astronomers observing the eclipse accurate time signals the U. S. Naval Observatory will broadcast special radio signals from 1:55 to 2:00 P. M. and from 3:55 to 4:00 P. M. Eastern Standard Time on Wednesday, Aug. 31, the day of the eclipse. The signals will be transmitted by NAA, Arlington, Va., on regular time frequencies of 113, 690, 4205, 8410, 12615, and 16820 kilocycles, and from Annapolis on 17.8 kilocycles. They will be rebroadcast by WGY, Schenectady, on 790 kilocycles and WCSH, Portland, Me., on 940 kilocycles.

## FRYEBURG

**A** FAMILY eclipse expedition is being planned by W. H. Fulweiler, chief engineer of the United Gas Improvement Co. of Philadelphia, who with Mrs. Fulweiler and their three sons, Jack, Tom and Spencer, will be located near Fryeburg, Me. on the day of the total solar eclipse, Aug. 31.

A twelve-foot focus camera will be in operation and a spectroscope of four-foot focus will be used. A movie camera will record the shadow bands and extensive measurements of total radiation and illumination of the eclipsed sun will be made with special thermocouples and photocells arranged for the occasion.

## NANTUCKET

**T**HE ECLIPSE expedition of the Maria Mitchell Observatory on the island of Nantucket will be located atop



a 250-foot tower at North Truro, Cape Cod, Mass., as guests of H. M. Aldrich. Dr. Margaret Harwood, director, will lead the party consisting of Miss Marjorie Williams, Mrs. Francis W. Davis, Miss Merle E. Turner, Albert E. Brock, Edgar F. Sanborn, Jr., Gerald M. Reed, Jr. and Nathan C. Davis.

This only scientific expedition to be located on Cape Cod will make photographs of the corona designed to study photometrically the light of the corona, using a 4-inch photographic telescope. Visual observations will be made with another telescope.

*Science News Letter, August 20, 1932*

#### RADIO-ASTRONOMY

### Sunspots May Interfere With Radio Observations

**M**AGNETIC storms may interfere with the radio observations of the total eclipse of the sun on August 31. This is predicted by A. M. Skellett of the Bell Telephone Laboratories, New York City.

Measurements of radio transmissions planned by numerous investigators during the eclipse will be related to the magnetic character of the day, Mr. Skellett pointed out. The state of the ionized regions of the atmosphere bears about the same relation to radio experiments as does the weather to the visual observations of the astronomers.

"On the basis of the 27-day recurrence tendency, it is probable that the earth's magnetic field and radio transmission will be disturbed moderately and possibly severely, the maximum disturbance occurring a day or so before the eclipse," Mr. Skellett predicted. "The date of the eclipse falls in a sequence of magnetic disturbances which have been active for at least three revolutions of the sun which has approximately a 27-day period.

"The latest storm of this sequence on August 1 or 2 has been of moderate intensity. A large sun-spot surrounded by bright hydrogen flocculi crossed the central meridian of the sun on August 2. On this basis a storm would be expected to begin on August 28 or 29 and might last until after the eclipse. Since the radio phenomena are different on days when magnetic storms occur from those on days without disturbance it is important that experiments to be carried out during the eclipse be planned with this possibility in mind."

*Science News Letter, August 20, 1932*

#### RADIO-ASTRONOMY

## Bureau of Standards To Study Radio During Eclipse

**With Apparatus on Both Sides of Path Scientists Will Hear Broadcasting Stations and Study Kennelly-Heaviside Layer**

**S**CIENTISTS of the U. S. Bureau of Standards will make extensive studies of the radio effect of the eclipse of the sun on Wednesday, August 31.

From a field location either in northeastern Maine or eastern Nova Scotia and simultaneously from the permanent laboratories at Washington, physicists and radio engineers under the direction of Dr. J. H. Dellinger will record the effects of the eclipse on the field intensities of received radio waves and on the height of the ionized or Kennelly-Heaviside layer.

The Washington location is expected to be very satisfactory for studies of changes in the ionized layer due to the optical eclipse as it is nine-tenths total at the earth's surface and somewhat nearer totality in the ionized layer above Washington.

The purpose of the observation in Maine or Nova Scotia is to test for the existence of effects in the ionized layer due to neutral corpuscles shot off from the sun. Professor S. Chapman, British physicist, has presented considerable evidence to show that the ionization of the lower part of the ionized layer, called the E-region, is probably produced by these corpuscles. (*SNL, July 30, p. 75; Aug. 13, p. 95*). Because the velocity of the corpuscles is much less than that of light, and because of the motions of the moon and earth during passage of the corpuscles from the moon to the earth, the corpuscular eclipse should occur two to two and one-half hours earlier than the solar eclipse, and farther to the northeast. These differences, particularly the difference in time, allow the effects of ultraviolet light and neutral corpuscles to be separated.

#### To Measure Ionized Layers

Three members of the Bureau of Standards staff will take to Maine or Nova Scotia two small pulse-signal transmitters, and an automatic recorder and a cathode ray oscillograph for measuring ionized layer heights. They will also observe the critical frequencies and heights of both the E and F regions of

the ionized layer. In order to help interpret the records obtained during the eclipse, observations will be made for several days preceding and following the eclipse.

Records of field intensities of received waves from broadcasting stations, and possibly from a high-frequency station, will be made both at Washington and on the eclipse expedition.

Dr. Dellinger explained that this type of work differs from the visual and some other observations in that it will not be prevented by clouds; and that there is reasonable certainty that successful work will be done.

*Science News Letter, August 20, 1932*

#### ASTRONOMY

### Lights Out During Eclipse, Astronomers Ask

**C**OOPERATION by amateur observers at the total eclipse of the sun over New England and Canada on Aug. 31 is requested by the astronomers, in order that any unwitting interference with the professional observations may be avoided. The eclipse committee of the American Astronomical Society, of which Dr. Frederick Slocum, of the Van Vleck Observatory at Middletown, Conn., is chairman, has requested laymen in the path of totality to avoid doing anything that might so interfere.

Tourists driving automobiles are requested to park their cars some time before the total eclipse, which comes about 3.30 P. M., Eastern Standard Time. Even though it will become dark enough to see the stars, they are requested not to turn on automobile lights. The glare from a single pair of head lights would ruin the view of all the observers in range. Similarly, town and city officials and residents of houses within the path, are requested not to turn on lights on streets or in buildings. The darkness will last less than two minutes even where longest, so all ordinary traffic and other activities can be suspended during totality.

Though dozens of groups of profes-

sional astronomers will be stationed along the path in eastern Canada and New England, the chances for clear weather are approximately the same all the way from the St. Lawrence to the Atlantic Coast. The eclipse will not be seen any better from one of the professional stations than from a point some distance away. The astronomers will be very busy for some time before the eclipse, making final adjustments, and during the eclipse they will give it their undivided attention. Even after it is over, they will still be busy, developing photographs, and taking down their apparatus. Consequently, most of the parties will have very little time to entertain visitors.

*Science News Letter, August 20, 1932*

#### ASTRONOMY

### New Comet Visible Through Binoculars

**W**ITH THE AID of binoculars a comet is visible in the northeastern evening sky. It is Peltier-Whipple comet, named after the two Americans who discovered it a few days ago. It is one of the brightest comets of recent years but will probably not become visible without slight aid in the form of a small telescope or good field glasses.

At present it is in the constellation of Perseus not far from the bright star Algol. It is moving rapidly northward several degrees a day and slightly eastward. It has a tail one degree long, or twice the diameter of the full moon.

An orbit computed by Dr. Fred L. Whipple of Harvard College Observatory, one of the discoverers, shows that the comet is about fifty million miles from the earth and that it will come closest to the sun at its perihelion near the end of August. The astronomers can not identify the comet with any previously observed and it is therefore considered a new one.

The Peltier-Whipple comet is magnitude 7 or 8. The comet was discovered by two American astronomers independently but so nearly at the same time that it will bear their names jointly. Leslie C. Peltier, an amateur of Delphos, Ohio, who has comets discovered in 1925 and 1930 to his credit, is one discoverer, while Dr. F. L. Whipple of the Harvard College Observatory also found it on a Harvard photograph.

The discovery was confirmed by Dr. H. M. Jeffers of Lick Observatory, California, and by an observation in Europe.

*Science News Letter, August 20, 1932*

#### ANTHROPOLOGY

## New Evidence Unearthed That Man Lived in Ice Age America

### Science Service Investigators Study Folsom Type Dart Point Newly Found With Bison Bones in Nebraska Quarry

**T**HAT ANCIENT man hunted strange bison in the Ice Age of ancient America, thousands of years before the accepted coming of Indians to America, receives further support through the investigation of discovery made in Nebraska by C. Bertrand Schultz, geology student of the University of Nebraska.

Science Service was notified of Mr. Schultz's discovery of a dart point associated with fossil bison in the Scott's Bluff quarry and authorized Dr. Earl H. Bell, anthropologist, and Dr. Edwin H. Barbour, geologist, of the University of Nebraska to investigate under the Science Service plan for archaeological and anthropological investigations.

By **DR. EARL H. BELL**, University of Nebraska

**T**HE DISCOVERY of a Folsom type dart point associated with fossil bison in a quarry near Scott's Bluff, Nebraska, was reported on August 4.

In 1929 from Custer County, Nebraska, and 1931 in Hall County, Nebraska, Mr. Schultz had reported similar finds. Unfortunately, though due to no fault of Mr. Schultz, these were not immediately investigated.

On August 5, Dr. Edwin H. Barbour, chairman of the department of geology, University of Nebraska, and I set out for Scott's Bluff to investigate this last discovery on behalf of Science Service.

Upon our arrival we found that Mr. Schultz and his party had done everything possible to keep the point in situ. It was discovered by the accidental caving off of the face of the bank which left the point protruding about half out. A support was built from below, but the crumbly nature of the matrix allowed it to slide out. The remaining mould, however, made positive its original position.

The point was surrounded by bison bones and pointed toward the face of the bank. It rested not more than three inches above the Brule clay.

The artifact was about one foot back from the original edge of the bank and

one and one-half feet below the original surface. It was completely surrounded by bones, laid nearly horizontal and pointed outward.

The point is two and three-fourths inches long and has a maximum width of one inch. The size and leaf-like shape indicate a dart rather than arrow point. The chipping is moderately good. It lacks the longitudinal groove but in general closely corresponds to one of the types found in the Folsom bison quarries in New Mexico.

The fossil bed in which the point was found is situated about three hundred yards north of Signal Butte and on the north bank of Spring Creek. Scott's Bluff, Nebraska, is about twenty-two miles northeast of the site. The exposed fossil layer is three feet thick, more than twenty feet long and was opened about six feet back for the face. The layer rested directly on the Brule clay, and is in an old river channel composed of water-worn pebbles of Brule, commonly seen in channel deposits of western Nebraska. Above the channel material is an over-burden of about fifteen feet of fine sandy material.

The layer is exceedingly rich in fossil bison bones, a large proportion of which are articulated. The bones distinctly differ from those of the modern bison and approach *Bison texanus* in form.

#### Fossil Seeds Significant

In evaluating this find as proof of Pleistocene man in America we are forced to consider two elements. In the first place: Is the stratum Pleistocene? In an unglaciated area such as western Nebraska, the stratigraphy must be largely determined by fossils. Dr. Barbour carefully studied the total situation, and besides the fossil bison he discovered freshwater and land snails, and pelecypod shells such as are commonly found in the western loess. In addition to these were the fossil hackberry seeds, *Celtis besseyi*, which are common in western Nebraska from the Pliocene upward into the Pleistocene. Dr. Barbour considered these very significant.



#### ICE AGE DART POINT

Discovery of this dart point in a Nebraska quarry may strengthen the theory that man lived and hunted in America during the Ice Age, thousands of years before the Indians came.

The presence of so many articulated bones bars the possibility of the stratum being redeposited Pleistocene. Dr. Barbour is certain that the deposit is Pleistocene.

The second problem is that of the possibility that the point may be intrusive to the bone layer. Unfortunately the point was not sufficiently below the surface totally to eliminate the possibility of accidental intrusion through earth cracks or gopher holes. However, the fact that the point lay flat and was surrounded by bones makes such a possibility at least unlikely. The fact that the artifact pointed outward eliminates the possibility that it may have been shot into the bank. The fact that the articulated bones rule out the possibility of redeposition also eliminates that external factor as a possible explanation of the association.

Dr. Barbour and I came to the conclusion that although conditions do not permit us to be absolutely positive that the point found by Schultz was made by a Pleistocene American and shot into a now extinct bison, the facts do lead us toward that position. Taken in conjunction with the other finds, the evidence for Pleistocene man in America is accumulating.

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#### PHYSICS

## Cosmic Ray Study Is First In Importance for Piccard

THE MOST important observations to be made by Prof. Auguste Piccard in his second ascent to the stratosphere will be measurements of the cosmic rays, which are also being given intensive recordings in all parts of the world by American scientists.

For scientists are not greatly excited over the possibility of a new manned balloon record being set in the event that the shining white aluminum gondola carries its human freight farther from earth than any instrument has transported men. Neither are they vitally interested in the records of temperature, pressure, or other properties of the upper atmosphere that Prof. Piccard and his assistant will undoubtedly make.

Sounding balloons, carrying continuously recording instruments, have risen to altitudes of over twenty miles, twice as high as Prof. Piccard hopes to go. These balloons of science, not carrying observers, have brought back reliable information about the region of no weather, where the temperature is always about 70 degrees Fahrenheit below zero and the air is so thin that no human being could suck enough oxygen out of it to keep alive.

#### Ten Miles of Weather

The Piccard balloon will pass through all the weather there is in rising to the lower part of the stratosphere. All the clouds that fill the sky, as well as the strongest winds that blow, are found below the ten-mile height which is the goal. There the sun will shine brightly in a black sky. One of the most surprising discoveries of the science of weather occurred thirty years ago when sounding balloons brought back the information that temperature above about ten miles up did not constantly decrease with height as it does lower down in what is known as the troposphere or zone of weather.

The flight of the giant balloon with its sealed spherical shell containing Prof. Piccard and his assistant will be a thrilling experience, comparable in the ocean of atmosphere to William Beebe's descents in his bathysphere to depths of about a quarter mile into the ocean.

The cosmic rays measurements which will interest scientists most will be made with an electroscope within the aluminum gondola. The measurements when compared with those being made under the direction of Prof. Arthur H. Compton of the University of Chicago this summer may throw light on the mystery of the cosmic rays.

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#### ANTHROPOLOGY

## Three Thighbones Confirm Java Ape-Man's Position

**P**ITHECANTHROPUS *erectus*, the ape-man of Java, has had his existence as a true zoological genus confirmed through the recent discovery of three more thighbones by Dr. Eugene Du Bois, Dutch surgeon-scientist famous for his original find of the much-disputed fossils over forty years ago. This is the opinion of Prof. G. Elliot Smith, English anthropologist.

The three newly discovered thighbones will be eagerly awaited by scientists, the more so because the original, or "type" specimen, is flawed with a bony outgrowth that probably made its owner lame. Except for this imperfection, the three new bones are declared to be identical with the *Pithecanthropus* type in every respect; and they were found at Trinil, the site of the original discovery.

During recent months, Java has been the scene of several dramatic developments in the story of early man. First came the discovery by W. F. F. Openoorth and C. ter Haar of remains of a race resembling Neanderthal Man, which has been named *Homo (Javanthropos) soloensis*. This greatly extends the known range of Neanderthaloid men, and casts doubt upon Dr. Henry Fairfield Osborn's theory that *Pithecanthropus* was a form that developed in Java because the tropics did not favor the evolution of higher types. Then came Dr. Du Bois' statement, a little over a month ago, that two other skulls found in Java suggest the origin of the black natives of Australia from a race that migrated via the East Indies.

*Science News Letter, August 20, 1932*



MEDICINE

# The First Morphine

## "Classic of Science"

### The Brave Pharmacist Who First Isolated the Alkaloid Did Not Hesitate to Try Its Toxic Effects on Himself

**UEBER DAS MORPHIUM**—On Morphine, a new salt-forming base, and meconic acid, as the chief constituents of opium. By Sertürner, pharmacist of Eimbeck in the Kingdom of Hannover. In *Annalen der Physik* (Gilbert), vol. 55, Leipzig, 1817. (Translated for the Science News Letter by Helen M. Davis).

#### Morphine

**E**IGHT ounces of dried opium was repeatedly digested with small amounts of hot distilled water, until this was no longer colored by it. The various washings after evaporation gave a clear extract, which upon dilution with water became very turbid, and only regained its transparency through the help of warming or a greater amount of water.

The extract diluted with water was saturated with ammonia while still warm, whereupon a grayish-white material precipitated, which however soon for the most part took on crystalline form, and displayed transparent grains. These, repeatedly washed with water until they no longer color it, are, as the following part of this investigation shows, the true, active principle of opium, *morphine*, but still mixed with extractive material and meconic acid.

When dried the material obtained from the clear little crystals weighed 16 drachms. It was treated with dilute sulphuric acid until slightly supersaturated, and from this solution precipitated anew by ammonia, and then repeatedly digested with dilute ammonia, with the intention of thus separating it from accompanying extractive materials. But this could not be entirely accomplished in this way, so I pulverized the precipitate to a fine dust, and digested it several times with very little alcohol, which became very dark in color. In this way I obtained about 8 drachms of nearly colorless morphine.

The morphine which dissolved in this alcohol was recovered by crystallization, but was of no importance. The extract-

ed material which was found with it in the alcohol, as well as in the ammoniacal extraction, was not the pure extract, but a basic morphine-extract, easily soluble in acids, dissolved with difficulty in water but easily in alcohol, and this extracted material the salts of iron color green. At the same time, however, morphine can be obtained from it when decomposed and a part separates as the oxide. Pure morphine is obtained from solution in acid as a fine glistening powder, and its true crystal form, a parallelepiped with oblique sides, which appears to be that of the extractive material which is combined with morphine, changes its characteristic shape to almost cubical grains. This change was brought about by treatment of this material with ammonia. It dissolved a part of the extractive material, which has the nature of an acid, though always combined with morphine and not able to be separated from it. Alcohol completed the separation, and dissolved the remaining extractive material in combination with morphine. There is a striking difference between the behavior of extracts with ammonia and those with alcohol. The first is more easily soluble in water, because it contains less morphine, than the *brown* substance obtained with alcohol; in the latter the extractive material predominates in which morphine occurs. And from this, through a solution of morphine in alcohol, that change comes about in the last resinous bodies in which morphine takes the lead and, as it were, exhibits a basic combination. The water extract of opium in the concentrated state is always broken up by ammonia into these two compounds.

The morphine so treated I dissolved again in alcohol, in order to get it quite pure, and let it crystallize, by which I obtained it quite colorless and beautifully crystallized in perfectly regular horizontal parallelepipeds with oblique sides. The crystallizable material obtained according to *Derosne* by extraction of opium with alcohol, on the other hand, assumes a prismatic form with an

angle of 30 to 40 degrees, and reddened an iron solution strongly.

Pure morphine has the following properties. It is colorless. In boiling water it dissolves to only a slight extent, but easily in alcohol and ether, especially when warmed; these solutions taste very bitter, and it crystallizes out of them in the form described. The spirituous as well as the water solutions turn the sensitive rhubarb pigment brown, even more strongly than turmeric, and restore the blue color to litmus paper reddened with acid; in this the ammonia employed has no part, because the pure morphine retains no trace of it, as is made sufficiently clear in following out the treatment of this material with potassium hydroxide. It dissolved in the acids with which I brought it in contact very easily, and formed with them specific completely neutral compounds, which make a series of remarkable salts. Of these I will describe the following:

*Morphine subcarbonate* is produced by mere contact of morphine with carbonic acid, and by decomposition of its solution with subcarbonate of potassium; it is more easily dissolved in water than morphine; its crystalline form I have not been able to investigate.—*Morphine carbonate* crystallizes in short prisms.—*Morphine acetate* crystallizes in fine rays, and is very easily soluble.—*Morphine sulphate* crystallizes in branched, radiating fibers, and is also soluble.—*Morphine chloride* forms feathery crystals, with which the ray-forming grouping may still be found; it is notably less soluble than the other morphine salts; and, if evaporation has been carried too far, it sets suddenly on cooling as a glistening, silver-white, feathery salt-mass.—*Morphine nitrate* arranges itself in rays which spread out on all sides from a common middle point.—*Morphine meconite* I have not prepared; *Morphine sub-meconite* however crystallizes prismatically, as it is obtained with alcohol from the opium extracted with water; it is difficultly soluble by itself, hence much water is necessary to free the opium residue entirely from it.—*Morphine tartrate* which crystallizes in ramified prisms shows much similarity in form to the foregoing.

Mountain-sick and miserable, soaked by rain during the day, covered with ten inches of snow at night, the eclipse party of

## S. P. LANGLEY

afterward Secretary of the Smithsonian Institution spent a week on the summit of Pike's Peak in 1878 and were rewarded by seeing the greatest extension of the corona yet observed. Their report is

### THE NEXT CLASSIC OF SCIENCE

These various salts of morphine seem to be very poisonous, for after every taste I felt a pain in my head. They are rather easily than difficultly soluble in water, and almost all are of a glistening luster and seem inclined to efflorescence. . . .

#### Effect of Morphine on the Human Body

The most important property of morphine is the effect which its administration produces in animals. In order to determine this with reliability, I have used myself for the test, and also persuaded a few other persons to do so, because experiments with animals do not lead to any exact result. I consider it a duty to observe most carefully the sinister effect of this new substance, in order to prevent possible accident; for it has even been publicly stated that this drug has been taken by several persons in fairly large quantities, without recognizing any effect from it. If what was taken in these cases was really morphine, it must follow that this substance is not dissolved by the gastric juice. My earlier experiments, which seem not to be well known, had already induced me to state explicitly that this drug is not dissolved except in alcohol or in a little acid, because it is dissolved in water with difficulty, and hence without it it could not be dissolved in gastric juice.

In order to prove my earlier researches thoroughly, I took three persons, of whom none was over 17 years old, to take morphine with me; warned by former experience, I gave each one only  $\frac{1}{2}$  grain dissolved in  $\frac{1}{2}$  drachm of alcohol diluted with one ounce of distilled water. A general flush, which was even seen in the eyes, spread over the face, especially the cheeks, and the life processes in general seemed speeded

up. When after  $\frac{1}{2}$  hour another  $\frac{1}{2}$  grain of morphine was taken, this condition was markedly increased, whereat a transient inclination toward vomiting and a dull pain in the head and stupor were experienced. Without waiting for the result, perhaps already very bad,  $\frac{1}{4}$  hour later still another  $\frac{1}{2}$  grain of morphine, as a coarse undissolved powder, was swallowed with 10 drops of alcohol and  $\frac{1}{2}$  ounce of water. The result was felt by the three young men quickly and in the highest degree. It showed itself by pain in the stomach, exhaustion and great faintness approaching unconsciousness. I also had the same fate; prostrate I fell into a dreamy state, and experienced in the extremities, especially in the arms, a slight twitching, which apparently accompanied the pulse-beat.

These characteristic symptoms of a true poisoning, especially the weakened condition of the three young men, caused me such anxiety that, half unconscious, I drank over a quarter bottle (6 to 8 ounces) of strong vinegar, and also had the others do the same. This was followed by such violent nausea that several hours afterward one, of the most delicate constitution, whose stomach was already entirely emptied, suffered very serious retching, painful to the highest degree. It seemed to me that the vinegar had given the morphine this violent, unceasing emetic property. On this assumption I gave him magnesium carbonate, to which the nausea yielded at once. The night passed in a deep sleep. Toward morning the sickness appeared again, but it promptly disappeared after a strong dose of magnesia. Absence of defecation and of appetite, stupor, pain in head and body did not wear off for several days.

*Science News Letter, August 20, 1932*

#### PUBLIC HEALTH

### Cancer Death Rate Shows Puzzling Sharp Increase

**D**EATH RATES from cancer have spurted upward alarmingly in the past year and a half in the face of extremely favorable general health conditions. Health statisticians are asking what forces are at work to cause this unprecedented rise in the deaths from cancer throughout the United States.

Figures compiled by the Metropolitan Life Insurance Company upon its industrial policyholders show a rise of 7.4 per cent. in the year 1931 and the reports for the first half of 1932 show a further rise of 9.5 per cent. over the rate for the like part of last year. This is in strong contrast to a relatively slow average rise of almost 1.5 per cent. a year in the period 1919 to 1930.

If the cancer deaths continue at the present rate during the rest of this year, the increase in the last two years will be three-fourths as much as during the preceding twelve.

Although official 1931 mortality statistics are not yet available for any large part of the country, the provisional reports received substantiate the Metropolitan's figures.

The actual increase in cancer deaths may not be as sharp as the figures indicate, since the reported increase may be due to more accurate diagnoses of cancer by physicians. But the Metropolitan statisticians suggest the possibility that "we are confronted with some influence that is increasing the true incidence of cancer."

*Science News Letter, August 20, 1932*

The belief that man has one less rib than woman persisted among the general public until the sixteenth century, when Vesalius demonstrated the facts.

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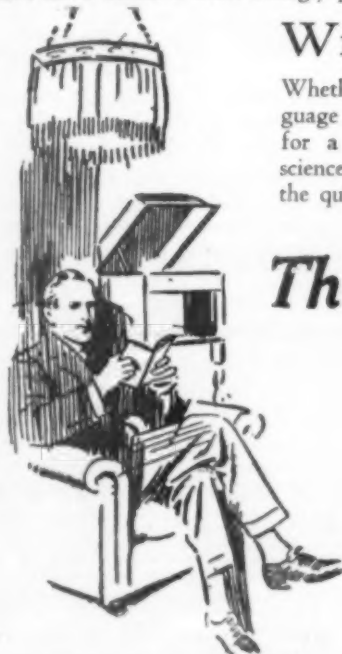
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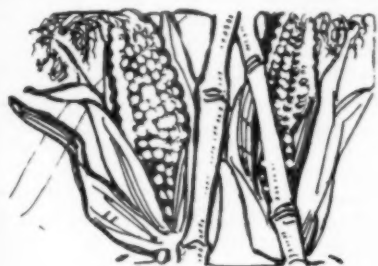
SNL



BOTANY

## NATURE RAMBLINGS

by Frank Thone



### Corn Farmers 1,000 Years Ago

**T**HE CORN we now grow is not essentially different from the corn grown by the Indians a thousand years ago.

The age of the highest development of the Pueblos in the Southwest has been determined at about 1000 A. D. This great Indian civilization knew corn—was, in fact, founded on corn. Corn was the principal crop these ancient aborigines grew on their irrigated farms on the canyon bottoms; it was their main dependence for food and the central fact around which their elaborate religious ceremonies revolved. To the Pueblos, corn was life.

For this reason, their dead were often buried with ears of corn in their hands. In the dry, hot earth of the caves, their bodies dried into mummies, with garments, weapons and all other funeral gifts intact. So it happens that scientists have recovered many ears of the corn they grew, and we know their varieties as accurately as we know the kinds of corn grown in our own township last summer.

This corn is not different in any essential from the corn grown in Iowa and Texas and Georgia now. The ears are shorter, to be sure, and have fewer rows of grains to the cob, but they are corn ears unmistakably. They are different from modern ears of corn as the Indians who raised them are different from modern men; but there is no more chance of mistaking them for another kind of grain than there is of mistaking a man for a monkey.

These thousand-year-old Pueblos had several varieties of corn, just as their descendants have today. And like the modern Pueblos, they seem to have attached much importance to the color of the grain, for there are red and blue

cobs as well as yellow. The corn grown by the present Pueblos is bigger, and on longer cobs, and white has been added to the grain colors. But it is very evidently the offspring of the grain of their ancestors.

Many centuries earlier than the "golden age" of the Pueblo culture their predecessors, the Basket-Makers, also raised corn. It was not greatly different from the corn of the Pueblos—differs less than the Pueblo corn does from modern types.

*Science News Letter, August 20, 1932*

ANTHROPOLOGY

### Lloyd's Lady Becomes Oldest True Human

**T**HE ANCIENT lady of Lloyd's, the skull previously famed as the oldest Londoner, has become the oldest known true human being of the species *Homo sapiens*.

She was so pronounced by Prof. G. Elliot Smith, British anthropologist, to the Congress of Prehistoric and Proto-historic Sciences. Prof. Smith finds the Lloyd's skull discovered in 1925 is modern in type but probably contemporary with early Mousterian times and therefore by many thousands of years the oldest known *Homo sapiens*.

The skull when first found was assigned to the late Stone Age or upper palaeolithic period, and Prof. Smith's new pronouncement probably more than doubles its previously accepted age of about twenty thousand years.

*Homo sapiens* is the species to which the existing races of men belong. The Neanderthal race is widely found and known from skeletons that have been excavated in Europe. These ancient men lived in Mousterian times, contemporaneously with the race of true men represented by the Lloyd's skull. But the Neanderthals are considered to be another species of *Homo* and not the direct ancestors of living men. The Neanderthal race died out in prehistoric times.

The Lloyd's skull interests scientists because it seems to push back the lineage of present races much farther than hitherto credited.

The oldest Londoner, in the opinion of Prof. Smith, was a left-handed lady, who lived to 45 or 50 years of age. Her broken skull was unearthed in 1925 from deep excavations for an office building for Lloyd's, the famous insurance firm.

The remains of prehistoric animals had already been found in the City

(financial district) of London near where the skull was found. Both above and below the level at which the skull was found bones of the mammoth have been discovered and, at a greater depth, the complete skeleton of a woolly rhinoceros. The deposits in which the present discovery was made belong to the pleistocene gravels of the Thames bed.

The skull was completely fossilized, and the state of the edge of the fractured bone, which was also completely fossilized at its fractured parts, showed that it had been broken in ancient times, at the time or possibly before it was deposited in the beds. There can be little doubt that it was carried to the spot, like the other animal bones, by floods coming down from higher up the river.

*Science News Letter, August 20, 1932*

BOTANY

### Fungus-Killing Fungus Found in Louisiana

**U**SUALLY, fungi mean to farmers nothing but foes. But a fungus has been found in Louisiana soil that appears to be a friend to the sugar planter, for it poisons another fungus, the *Pithium* species that attacks the roots of cane.

The discovery was made by E. C. Tims of the University of Louisiana. Laboratory tests indicate that the fungus-killing fungus does not act merely by robbing the parasite of its nourishment, but that it apparently produces something that is an active poison to it.

*Science News Letter, August 20, 1932*

▼ The Science Service radio address next week will be on the subject,  
**R** HEADHUNTERS OF THE AMAZON  
**A** by  
**D** Matthew W. Stirling  
 Chief of the Bureau of American Ethnology of the Smithsonian Institution  
**I** FRIDAY, AUGUST 26  
**O** at 2:45 P. M., Eastern Standard Time  
 Over Stations of  
 ▲ The Columbia Broadcasting System

# • First Glances at New Books

## Physics

**PHILOSOPHY AND MODERN SCIENCE**—Harold T. Davis—*Principia Press, Bloomington, Ind.*, 335 p., \$3.50. The professor of mathematics and the philosophy of natural science at Indiana University has written a readable history of the development of physics and its implications. He sees today the merging of two streams of speculative thought which have their sources in the high plateaus of Greek philosophy, one flowing through the philosophies of Descartes, Berkeley, Kant, Poincaré and Mach, the other through the experiences of Galileo, Newton, Fresnel, von Helmholtz, Faraday, Lord Kelvin, Maxwell and Lorentz.

*Science News Letter, August 20, 1932*

## Education

**LEADERS IN EDUCATION**—Edited by J. McKeen Cattell—*Science Press*, 1037 p., \$10. This biographical directory in its first edition is companion to American Men of Science and deserves a place on that shelf of indispensable reference books. It contains over 11,000 objective biographies of those who have done the most to advance education, whether by teaching, administration, publication or research.

*Science News Letter, August 20, 1932*

## Prehistory

**CHRONOLOGICAL TABLE OF PREHISTORY**—Miles Burkitt and V. Gordon Childe—*Antiquity*. Issued as a supplement to *Antiquity* for June, 1932, this chart is worthy of special note. It arranges in parallel columns, by geographic units, all the Old-World culture stages from paleolithic to the beginning of the Christian era, showing their chronological correspondences.

*Science News Letter, August 20, 1932*

## Botany

**THE AMERICAN SPECIES OF THIBAUDIAEAE**—Albert C. Smith—*Govt. Print. Off.*, xiii+236 p., 19 pl., 35c. A monograph of a tropical tribe of the Vacciniaceae, or blueberry family.

*Science News Letter, August 20, 1932*

## Sociology-Ethnology

**FACING THE FUTURE IN INDIAN MISSIONS**—Lewis Meriam and George W. Hinman—*Council of Women for Home Missions and Missionary Education Movement*—244 p., paper 60c., boards \$1. The modern Indian and religion

is the subject of this book which discusses the problem from many angles. Part One, "A Social Outlook on Indian Missions," is by Mr. Meriam, who was technical director of a survey of the Indian problem made by the Brookings Institution, a few years ago. Part Two, "The Church and the Indian," is by Dr. Hinman who is actively engaged in Indian mission enterprises.

*Science News Letter, August 20, 1932*

## National Parks

**100 YEARS IN YOSEMITE**—C. P. Russell—*Stanford Univ. Press*, 242 p., \$3.50. A fine addition to the already noteworthy series of National Parks books published by the Stanford University Press, this book gives a detailed history, well illustrated and excellently documented, of one of the grandest and most fascinating of our American wonderlands.

*Science News Letter, August 20, 1932*

## Patent Nonsense

**BEWARE OF IMITATIONS**—Compiled by A. E. Brown and H. A. Jeffcott, Jr.—*Viking Press*, 125 p., \$1. A book of the genre of *Boners*. The authors have turned to the solemn files of the U. S. Patent Office, and reproduce here the drawings and specifications of such devices as waterwings for horses, goggles for chickens, combination matchbox and mousetrap—and a few of a more Rabelaisian cast. The effect is downright devastating.

*Science News Letter, August 20, 1932*

## Drama

**A HISTORY OF THE MOVIES**—Benjamin B. Hampton—*Covici-Friede*, 456 p., \$5. Not science but the movies as a business occupy this well-illustrated volume that will be of immense interest to anyone who has lived through the rise of the movies.

*Science News Letter, August 20, 1932*

## Genetics

**A TEXTBOOK OF GENETICS**—Arthur W. Lindsey—*Macmillan*, 354 p., \$2.75. A solidly written, well illustrated, up-to-date text, suitable for university class use.

*Science News Letter, August 20, 1932*

## Ethnology

**GIVERS OF LIFE**—Emma Franklin Estabrook—*Marshall Jones*, 108 p., \$2. Dedicated "To the American Indian, one of the creative races of men," this little book sets forth advances made by the Indians before white men came to disturb their culture. Pueblo Indians are mainly chosen to illustrate the theme. Mrs. Estabrook describes their achievements as artists, poets, dramatists, as farmers, inventors, town builders, engineers, and law makers.

*Science News Letter, August 20, 1932*

## Geography

**DAYS IN THE PAINTED DESERT AND THE SAN FRANCISCO MOUNTAINS**—Harold S. Colton and Frank C. Baxter—*Museum of Northern Arizona*, 113 p., \$2. "The purpose of this guide," the authors explain, "is to 'tell people' about the Painted Desert and the adjoining San Francisco Mountains, which form one of the most picturesque and interesting regions in the world; and to give detailed itineraries for motor travel to the places of interest." The first edition of this handbook proved so useful and popular that this new edition has come out. Besides scenery, the guidebook tells of the Hopi pueblos, the Indian dances, the geology of the region, and its plant and animal life.

*Science News Letter, August 20, 1932*

## Chemistry

**BIBLIOGRAPHY OF BIBLIOGRAPHIES ON CHEMISTRY AND CHEMICAL TECHNOLOGY**, Second Supplement, 1929-1931—Clarence J. West and D. D. Berolzheimer—*National Research Council*, 150 p., \$1.50. Scientific literature is so complex these days that bibliographies once removed perform a useful service. This bulletin 86 of the National Research Council brings up to date the original publication of 1925, first supplemented in 1929.

*Science News Letter, August 20, 1932*

## Geology

**THE GEOLOGY OF WALLACE COUNTY, KANSAS**—Maxim K. Elias—*State Geological Survey, Lawrence, Kansas*, 254 p., 62 pl., 25c. The extraordinarily fine development of Upper Cretaceous and Tertiary formations in this northwestern Kansas county makes this detailed report of much more than local interest.

*Science News Letter, August 20, 1932*

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